CLAIMS:

1. A hard disk drives comprising: seek control means for moving a magnetic head which reads/writes information of a magnetic recording medium to a target position, wherein:

said seek control means corresponds to a velocity control system which produces a target value based upon a target track, a present position, and a remaining distance from a commencement of a seek operation up to a time instant when a sign of an operating amount is changed; and said seek control means corresponds to a Two Degree of Freedom control system which sets an waveform by a function of time as a target value after the time instant when the sign of the operating amount is changed.

2. A hard disk drives comprising: seek control means for moving a magnetic head which reads/writes information of a magnetic recording medium to a target position, wherein:

said seek control means is comprised of: a velocity control system in which an operating amount is calculated based upon a deviation between a target track and a present position of said magnetic head; a Two Degree of Freedom control system in which an operating amount is calculated based upon time; and switching means for switching said velocity control system into said Two Degree of Freedom control system at a time instant when a sign of the operating amount is changed.

3. A hard disk drives comprising: seek control means for moving a magnetic head which reads/writes information of a magnetic recording medium to a target position, wherein:

said seek control means is comprised of: a velocity control system in which an operating amount is calculated based upon a deviation between a target track and a present position of said magnetic head; a Two Degree of Freedom control system in which an operating amount is calculated based upon time; and switching means for switching said velocity control system into said Two Degree of Freedom control system at a time instant when a sign of the operating amount becomes zero.

4. A hard disk drives as claimed in claim 1 wherein:

the seek operation of said magnetic head includes an accelerated velocity mode, a uniform velocity mode in which acceleration becomes substantially zero, and a decelerated velocity mode; and

a time historical response of acceleration during decelerating operation within at least two move distances is expressed by a polynomial of time.

5. A hard disk drives as claimed in claim 1 wherein:

the seek operation of said magnetic head includes an accelerated velocity mode, a uniform velocity mode in which acceleration becomes substantially zero, and a decelerated velocity mode; and

when a time instant of a point where the decelerating operation is commenced is assumed as "T1" and a time instant of an median between said time instant "T1" and an end of the seek operation is assumed as "T2", a time historical response of acceleration within a section defined from the time instant "T1" to the time instant "T2" is approximately expressed by a polynomial of time which contains both an one-time integrated value of acceleration from the commencement of the seek operation up to the time instant "T1", and a two-time integrated value of the acceleration from the commencement of the seek operation up to the time instant "T1" as an initial value.

6. A hard disk drives as claimed in claim 4 wherein:

a control amount of the decelerated velocity mode corresponds to a head position.

7. A hard disk drives as claimed in claim 4 wherein:

a control amount of the decelerated velocity mode corresponds to a head velocity.

8. A hard disk drives comprising: a magnetic recording medium; a magnetic head for reading/writing

information of said magnetic recording medium; a voice coil motor VCM for driving said magnetic head; and seek control means for moving said magnetic head to a target position; wherein:

a seek operation of said magnetic head includes an accelerated velocity mode and a decelerated velocity mode;

said seek control means corresponds to a velocity feedback control system in the accelerated velocity mode, and also, corresponds to a Two Degree of Freedom control system for setting a magnetic head position by a function of time as a target value in the decelerated velocity mode;

said velocity feedback control system is comprised of: a target velocity generator for setting a target velocity based upon a deviation between a present head position "P" and a target track "Ref"; a velocity predicting device for forming a predicted velocity based upon a head position signal "P"; a velocity control device for acquiring a VCM control signal based upon a deviation between said target velocity and said predicted velocity; a position control device for capturing a positional error equal to a deviation between a model position for a positional feedback purpose and the head position signal "P", and for outputting a positional feedback input used to compress said positional error; a rigid-body position model, a rigid-body velocity model, and a resonance model of said magnetic head, which capture a deviation between said VCM control signal and said positional feedback input; and also, a delay model for capturing a summation between an output of said rigid-body position model and an output of said resonance model, and for outputting said model position for positional feedback purpose; and

said Two Degree of Freedom control system is comprised of: an acceleration waveform for outputting a feedforward input based upon an initial value when the mode is switched from the accelerated velocity mode; velocity waveform for outputting a target value based; a resonance model for capturing said feedforward input; a delay model for capturing a summation between an output of a position waveform "Pt" and an output of the resonance model; a position control device for capturing a positional error equal to a deviation between an output of the delay model and a head position signal "P"; and adding means for setting a summation between said feedforward input and an output of said position control device as the VCM control signal.

9. A hard disk drives comprising: a magnetic recording medium; a magnetic head for reading/writing information of said magnetic recording medium; and seek control means for moving said magnetic head to a target position; wherein:

a seek operation of said magnetic head

includes an accelerated velocity mode and a decelerated velocity mode;

said seek control means corresponds to a velocity feedback control system in the accelerated velocity mode, and also, corresponds to a Two Degree of Freedom control system for setting a magnetic head velocity as a target value in the decelerated velocity mode;

said velocity feedback control system is comprised of: a target velocity generator for setting a target velocity based upon a deviation between a present head position "P" and a target track "Ref"; a velocity predicting device for forming a predicted velocity based upon a head position signal "P"; a velocity control device for acquiring a VCM control signal based upon a deviation between said target velocity and said predicted velocity; a position control device for capturing a positional error equal to a deviation between a model position for a positional feedback purpose and the head position signal "P", and for outputting a positional feedback input used to compress said positional error; a rigid-body position model, a rigid-body velocity model, and a resonance model of said magnetic head, which capture a deviation between said VCM control signal and said positional feedback input; and also, a delay model for capturing a summation between an output of said rigid-body position model and an output of said resonance model, and for outputting said model position for positional feedback purpose; and

said Two Degree of Freedom control system is comprised of: an acceleration waveform for outputting a feedforward input based upon an initial value when the mode is switched from the accelerated velocity mode; velocity waveform for outputting a target value based upon said initial value; a delay model for capturing an output of said acceleration waveform; a velocity predicting device for predicting a velocity based upon a head position signal "P"; adding means for calculating a velocity error based upon a deviation between an output of said delay model and an output of said velocity predicting device; a velocity control device for outputting a velocity feedback input based upon the velocity error; and adding means for adding said feedforward input to said velocity feedback input so as to obtain the VCM control signal.

10. A hard disk drives as claimed in claim 8 wherein:

the seek operation of said magnetic head includes a uniform velocity mode in which acceleration becomes substantially zero between said accelerated velocity mode and said decelerated velocity mode; and

a velocity control system same as said accelerated velocity mode is employed during said uniform velocity mode.